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by the use of two injecting fluids, of different densities, one passing through the capillaries, the other arrested at the capillaries, the whole vascular system may be injected from the aortic arch.

The application of the principle is as follows: (1) The animal is immersed in tepid water and the heart is uncovered. (2) The apex of the single ventricle, in the case of an amphibian, or of the left ventricle in the case of higher animals is then laid widely open and the blood allowed to flow freely from the auriculo-ventricular aperture (see *p* in the figure). (3) A cannula is then inserted a short distance into the arterial bulb and the first ligature is fastened around the nozzle. The second ligature is then made ready around the base of the ventricle, thus surrounding the auriculo-ventricular apertures. (4) An ordinary gelatine injecting mass, stained deep red or purple, is in the meantime prepared. When the body is thoroughly warmed, this mass is slowly injected. As the second ligature is still loose, a quantity of blood gradually followed by the gelatine issues from the auriculo-ventricular opening. (5) When the gelatine begins to run pretty clear, the second ligature is fastened and the syringe containing gelatine is replaced by another containing a red plaster-of-paris injecting mass. The latter drives the gelatine contained in the arteries before it as far as the capillaries, thus completely filling the venous system. When the gelatine is thoroughly cooled the animal is ready for dissection.

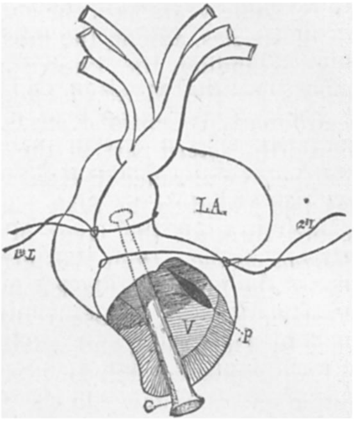

FIG. 1.—Illustrating method of preparing the frog's heart. *V*, ventricle; *LA*, left auricle; *p*, auriculo-ventricular opening; *1st L* and *2d L*, first and second ligatures; *C*, cannula.

This method can be applied with considerable ease to all the smaller animals, such as frogs, lizards and pigeons, in preparation for class-work or investigation. Its advantages are numerous. Among its disadvantages may be mentioned the fact that alcohol cannot well be used as a preservative, because it dehydrates the gelatine, causing it to shrink and break up the veins. This difficulty is entirely obviated, however, by the use of Wickersheimer's fluid, in which the injection remains perfect for an indefinite time.—*Henry F. Osborn.*

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SCIENTIFIC NEWS.

—The Washburn Biological Survey of Kansas, says the Kansas City *Review*, has for its object "to investigate the fauna and flora of a State which, together with Indian territory, holds the key to a more definite knowledge of the inter-relationship of four great faunal regions."

To the list of Kansas mammals as given by Professor M. V. B. Knox, some years ago, the survey has been able to add a number of species, among the most interesting of which, as considerably extending the known geographical distribution of the species, are the Mexican badger, two specimens of which have been found in Central Kansas, and the free-tailed bat, found in the north-eastern part of the State. Both are Southern species and their occurrence in Kansas is a matter of some surprise. It has also added to the State fauna the Georgian bat, and is able to record, through the favor of Professor Snow, the little shrew, *Blarina parvula*, from Western Kansas. It would call attention also to the long lost black-footed ferret, or prairie dog-hunter, of Western Kansas, whose rediscovery was recorded a few years since by Dr. Coues, and would urge our collectors and hunters to keep vigilant watch for it with a view to ascertaining its distribution and abundance in the State. Does the distribution of this ferret coincide with that of the prairie-dog? The survey is also gathering statistics with a view to determining the exact distribution of the prairie-dog in Kansas, and its relations to civilization and agriculture. Is the prairie-dog favorable or adversely affected by the advance of civilization upon him? Have the "deserted towns" of this animal become such owing to a desire to shun observation and molestation by man, or were the migrations which they record induced by desire for better forage grounds, or by other causes? Items of information tending to shed light upon the distribution, increase, or extermination, habits, and economic relations of this and other species of the animals of Kansas are greatly desired. For some of our species the historical material must be gathered at once, or it will never be fully known. With birds, as already intimated, the survey is not concerned.

In reptiles, perhaps the most interesting discovery is that of a second species of green snake, the slender green snake, *Cyclophis æstivus*, an austroriparian species, collected by Colonel N. S. Goss, at Neosho falls. Kansas is doubtless the northern limit of this bright-hued, active Southern serpent.

Of fishes the survey has made considerable collections, mainly of smaller forms. Three species new to science have already been described in its reports, and the pretty little zebra-fish of the Rio Grande river, known until recently by Girard's imperfect description only, has been re-discovered and fully described from material sent from Ellis, Kansas, by Dr. L. Watson. The zebra-fish has since proved to be one of the commonest fishes of Western Kansas, scores having been taken from a little stream near Garden City by the writer in two days' collecting last August. The lamprey eel of Kansas, parasitic on the buffalo-fish, etc., proves to be usually the *chestnut* lamprey, and the material collected tends to confirm the suspicion expressed by Jordan and Gilbert in their "Synopsis of Fishes of North America" that this and the silvery lamprey may be only varieties of one and the same species.

—At a late meeting of the Royal Microscopical Society, Dr. Maddox read a paper, "An experiment on feeding some insects with a 'comma' bacillus, and also with another bacillus (*Bact. subtilis*)," illustrating the subject by preparations exhibited under the microscope.

Mr. Cheshire said that he must, in the first place, congratulate Dr. Maddox on the time he had been able to keep his bees alive in a state of isolation. They were not at all easy to keep so under ordinary circumstances. He had tried himself some similar experiments, and thought he had succeeded in infecting *Musca vomitoria;* but it might be well to remark that in one hive bee he had found eight or ten distinct kinds of bacilli, one of which had a distinct curvature. Amongst bee-keepers there used to be an idea that the bees had no diseases, although there was one affecting the larvæ, but directly a careful examination of the bees was made it was found that they were subject to a great many. One kind had the curious effect of causing all the hairs to fall out, and on examining bees which were so affected he found them all to contain large numbers of the short red bacillus. If any one intended to experiment in these matters it might be useful to know that if the bees were fed with food stained with aniline dyes very curious effects were produced upon the internal organs. Differentiation took place within the body, and when they came to dissect them afterwards they would find it a very great help.

—Among the new investigations started in the Department of Agriculture, not the least important is one relating to economic ornithology. This work has been begun as a branch of that of the Division of Entomology, of which Professor C. V. Riley has charge. Dr. C. Hart Merriam, a well-known ornithologist, and secretary of the American Ornithologists' Union, has been appointed a special agent to take charge of this part of the divisional work. Dr. Merriam will make his headquarters at Sing Sing, New York, until October 1st, and after that at Washington.

The scope of the investigation will cover the entire field of the inter-relation of birds and agriculture, particularly from the entomological standpoint. The inquiry will relate primarily to the *food-habits* of birds, but will include also the collection of data bearing on the migration and geographical distribution of North American species. In this last inquiry the department hopes to have the coöperation of the American Ornithologists' Union, Dr. Merriam being in charge of the Committee on Migration for said Union.

—An officer of the Italian navy (reports *Nature*) after a course of four months' instruction at the Zoölogical Station at Naples, was attached to the corvette *Vettor Pisani.* After an absence of five months the first consignment arrived—the product of deep-sea work, of dredging and coast-fishery along the shores of Gibraltar, Brazil, and Montevideo; a second collection still more extensive than the first was made during a voyage from Montevideo to Cape Horn, and among the islands of the Patagonian group. Other collections have been made on the Peruvian coast, the Gallapagos islands, and from Panama; also animals from small pools and rivers in Peru. Those from Peru comprise two complete series of embryonic forms—one of a ray, the other of a toad. The *Vettor Pisani* continued its course from Peru to the Philippine islands and China. The results have been so satisfactory that three other Italian naval officers were received at the station, one of them being afterwards stationed at the mouth of the Red sea, while another is collecting in the Mediterranean.

—Dr. W. J. Lewis draws attention to the importance in legal cases (when it is often inpossible to determine whether certain blood stains are human or animal), of the evidence to be derived from a microscopic study of the hairs or textile fabrics of one sort or another generally found entangled with the blood-stains on a weapon that has been used in a murderous assault. He illustrates the value of such evidence by reference to actual cases, and points out the differences between human and animal hair, and the distinguishing features of hair from those of the more common filaments which may be mistaken for it, such as the finer fibers of jute, linen, silk and cotton. The characteristic distinctions which exist between human and animal hair are briefly indicated under four heads viz: (1) The relative proportions of the cortical and medullary structures; (2) The size, shape and arrangement of the medullary cells; (3) The size, shape and arrangement of the superficial cortical cells; (4) The size and shape of the hair-shaft.—*Journal of the Royal Microscopical Society, June, 1885.*

—The effects of the poison of the cobra de capello have been studied, says *Nature*, by Herr Gnezda. The poison was obtained in India by causing the snakes to bite into snails or mussels wrapped in gutta-percha and filled with water. The watery solution thus obtained was reduced by evaporation. The poison belongs to the class of propeptons. Different vertebrates susceptible to the poison died when the dose of the poison amounted to three mg. per kilogramme animal. The time when death followed a full dose of the poison was very various. Rabbits died after half an hour, pickerels after an hour, frogs later, then cats, and lastly pigeons. Stronger doses hastened death. Dilutions and the introduction of artificial respiration delayed death. The poison affected the nerves, especially the central nervous system, and had hardly any effect on the heart.

— Prof. Robert von Schlagintweit, the eminent ethnographer and geographer, died June 13th, in Giessen, at the age of 52. The name of the deceased is chiefly connected with the journey of scientific investigation made by him in 1854–7, in Central India and the Himalayas, in conjunction with his brothers Hermann and Adolphus. The expedition was fitted out at the expense of the King of Prussia and the British East India Company, and added many important and interesting facts to our knowledge in the domains of geography, meteorology, geology, and ethnology. An account of the journey was published in English under the title of "Results of a Scientific Mission to India and High Asia." Prof. Robert von Schlagintweit also traveled in North America, and wrote several shorter works on his experiences there.

— Mr. Mellard Reade's presidential address to the Liverpool Geological Society has been reprinted in the form of a pamphlet entitled "Denudation of the two Americas." The essay may be regarded as a sequel to the address in which he discussed the effects of chemical denudation as a geological agent. He insists strongly on the importance of applying quantitative methods to the study of geological phenomena. In the present paper he calculates the amount of solid matter removed in river-water from the surface of some of the principal river-basins of America. Mr. Reade thinks that the matter which exists in chemical solution in river-water has more importance as a factor in the reconstruction of the earth than is generally recognized by geologists. —*English Mechanic.*

— Prof. C. V. Riley, entomologist of the United States Department of Agriculture, has published Bulletin No. 8, with 46 pages on the periodical or seventeen-year Cicada, comprising an account of *Cicada septendecim* and its *tredecim*, or thirteen-year race, with a chronclogy of all broods known. A circular has also been issued by the Division, containing lists of localities where these two races last appeared, and a request for information regarding the appearance of the insect during the past season. Brood XXII of Septendecim appeared in 1868, locally, in the following States: New York, Massachusetts, Vermont, Pennsylvania, Ohio, Indiana, Michigan, Delaware, Maryland, District of Columbia, Virginia, Kentucky, and Georgia.

— The second volume of the Proceedings of the Biological Society of Washington contains the following longer articles: The principles of zoögeography, by Theo. Gill; Certain phases in the geological history of the North American continent, biographically considered, by C. A. White; Notes on North American Psyllidæ, by C. V. Riley; remarks on the bag worm (*Thyridopteryx ephemeræformis*), by C. V. Riley, with ichthyological and ornithological articles by Messrs. Goode, Bean, Dresel, Stejneger and Ridgway; while Mr. W. H. Dall describes some Hydrocorallinæ from Alaska and California, and Mr. Lester F. Ward enumerates the plants added to the flora of Washington, from April 1, 1882, to April 1, 1884.

—It will be remembered that the Legislature of New York made an appropriation of $18,000 for a course of free public instruction at the museum in human and comparative anatomy, physiology and zoölogy, etc. The course having already proved successful, funds have been promised, as we understand, to enlarge the museum by the addition of the rotunda planned in the original designs for the entire building, by which a lecture hall capable of seating 1200 persons may be built, with other rooms for the display of collections. The museum authorities have greatly strengthened the scientific corps by the appointment of Mr. J. A. Allen, the eminent ornithologist, as an assistant in the museum.

— Volume VI of the Monographs of the United States Geological Survey is devoted to Professor W.M. Fontaine's contributions to the knowledge of the older Mesozoic flora of Virginia, bearing date of 1883, but only recently distributed. The work is based upon the results of several years' diligent search in the older Mesozoic strata of Virginia. It comprises 144 pages of description, and is illustrated with fifty-four plates, some of them reprints of Emmons' figures of Mesozoic plants from North Carolina.

— A new method of collecting rhizopods has been practiced by Professor H. Blanc, who obtained material from the deep water of Lake Geneva by lowering to the bottom a large St. Andrew's cross, to the four extremities of which are attached pieces of very thick glass. After three or four weeks this is raised to the surface again, and the fine mud that has collected on the pieces of glass removed with a brush.

— A new gutta-percha plant has been brought to the notice of the French Academy (*Nature*, May 21), by E. Heckel, who suggests that as a substitute for the *Isonandra gutta* Hooker, which is threatening to disappear, *Butyrospyrum parkii* Kotschy, be used, which possesses similar properties, and which is widely diffused throughout equatorial Africa, between Upper Senegal and the Nile basin.

— A new genus of fleas described by W. Schimkewitsch, under the name of *Vermipsylla alakurt*, has been found to infest cattle in Turkestan, producing great debilitation, or even death. It was observed in the greatest abundance during severe frosts. Originally it is nearly black, but when distended becomes white, with variegated bands (*Zoöl. Anzeiger*, VIII, p. 75).

— At the May 5th meeting of the London Zoölogical Society, Mr. J. Bland Sutton read a paper on hypertrophy and its value in evolution, in which he attempted to show that material changes in structure might be the result of what was originally a pathological condition.

—At the same meeting Mr. E. T. Newton read a paper on the remains of a gigantic bird (*Gastornis plasseni*) from the English Lower Eocene. The author observed, reports *Nature*, that these fossils proved that in early Eocene times England was inhabited by a race of birds which equaled in their proportions some of the more massive forms of the New Zealand moas.

—Hon. J. D. Cox publishes in the Journal of the Royal Microscopical Society for June an interesting article on the structure of the diatom shell, in which he attempts to prove the actual presence of films of silex, whose tenuity is so great that they are not visible by ordinary transmitted light.

—The Des Moines Academy of Science has issued the first number of its Bulletin, which contains, besides an introductory note, an article by R. E. Call, entitled a geographic catalogue of the Unionidæ of the Mississippi valley.

—Professor J. H. Whiteside, the æronaut, has presented to Woodward's Gardens a canary twenty-two years old. The bird is sightless, songless and very feeble.

—We learn that Dr. Taschenberg, of Halle, is preparing a new edition of the well-known Bibliotheca Zoölogica of Agassiz and others.

—Dr. Franklin B. Hough died June 11th, 1885, aged 62. He was for a while United States Commissioner of Forestry, and gave much attention to that subject.

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PROCEEDINGS OF SCIENTIFIC SOCIETIES.

Philadelphia Academy of Natural Sciences.—April 14.—Dr. H. C. McCook stated that spiders allied to the line weaver, *Theridion tepedariarum*, preserve their activity and spinning habit while exposed to cold ranging from freezing point to zero; that after long and severe exposure they rapidly recover their activity when brought into a warm temperature, and at once resume their habits on the return of spring, even after a severe and prolonged winter. The young of the orb-weavers survive the winter in the admirably arranged cocoons provided by maternal instinct. Early in the spring many nearly full-grown spiders may also be found, all of which have safely weathered the cold months.

A paper entitled "Notes on Mesozoic cockroaches," by S. H. Scudder, was presented for publication.

April 28.—Mr. Morris stated his conviction that the swim-bladder in fishes was a degenerate organ, formerly of use, but now without an important function. The fact that in embryonic states